

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
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)
Amendment of Part 101 of the Commission's Rules to)
Facilitate the Use of Microwave for Wireless Backhaul)
and Other Uses and to Provide Additional Flexibility to)
Broadcast Auxiliary Service and Operational Fixed)
Microwave Licenses)

REPLY COMMENTS OF WIRELESS STRATEGIES INC (WSI).

Re: Amendment of Part 101 of the Commission's Rules to Facilitate the Use of
Microwave for Wireless Backhaul and Other Uses and to Provide Additional
Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave
Licenses, WT Docket 10-153

I. Introduction

With the proposed use of "Adaptive Modulation" and "Auxiliary" stations the Commission has presented industry with an opportunity to find innovative ways to dramatically increase the effective use of spectrum while lowering the cost of backhaul and access. It is a pity that some filers, instead of looking for innovative ways to capitalize on the opportunity, look for ways to maintain the status quo by attempting to stifle innovation through unsubstantiated fears of abuse of the rules and harmful interference.

II. Adaptive Modulation

General

In its comments WSI agreed with the proposed changes to the Rules to allow FS licensees to use equipment that, through adaptive modulation, can maintain communications when adverse propagation characteristics would otherwise force communications to be terminated. WSI also stated that the concerns that the use of adaptive modulation would allow for inefficient, low data rate usage part of the time were misplaced because equipment with adaptive modulation will always operate at the maximum spectral efficiency and only move to lower modulation schemes in order to maintain communication during adverse propagation conditions.

Fears of Potential Abuse of Adaptive Modulation are based on a False Premise

The comments filed by Verizon, Comsearch et al have raised the concern that licensees will abuse the adaptive modulation feature by deliberately operating the path below the default fade

margin for long periods of time. This is based on the premise that there is a valid reason for a licensee to do so, when there is not. The market always wants the highest data throughput with the highest availability at the lowest cost.

Rule 101.141 (a) (3)

Minimum payload capacity is a function of the microwave radio and is clearly defined in Rule 101.141(a) (3), specifying the minimum payload capacity (Mbits/s) with a given nominal channel bandwidth (MHz). All licensed radios must meet or exceed this requirement and it is implicit that the minimum payload capacity will be met while the link is operating within the designed fade margin. Also, for systems with adaptive modulation the transmitter power output for all modulation states must never exceed the coordinated output power.

If the Commission deems it necessary to make what is implicit "explicit" then WSI suggests adding two footnotes to Section 101.141 (a) (3):

1. The minimum payload capacity must be met while the link is operating within its designed fade margin.
2. When using adaptive modulation, the transmitter output power for all modulation states must never exceed the coordinated output power.

Path Availability

Verizon and Comsearch et al are proposing the Commission impose an arbitrary value to path availability. As their arguments for imposing such a rule are based on a false premise, their arguments are moot.

Path availability is a quality of service feature and has always been defined by the market. The following example illustrates why path availability should be defined by the market and not by a rule with an arbitrary value.

Example:

A rural community with only dial-up asks a WISP to provide them with low-cost high-speed Internet access. The WISP proposes a licensed microwave backhaul system with a path availability of 99.9% and an unlicensed distribution system at a combined price the community is willing and able to pay.

However, if the FCC were to mandate that unless a WISP can provide service via microwave with an availability of 99.995%, as proposed by Comsearch, the service would be denied.

The consequences would be:

1. Although the community could be provided with broadband an average of 23 hours, 58 minutes and 34 seconds a day, the FCC's decision would deny the community the benefits of broadband and condemn them to 24 hours per day of dial-up.
2. Spectrum management companies would be denied prior coordination and licensing revenue.
2. Manufacturers would be denied the sale of equipment.
3. Employment would be denied to installation crews and technicians.
4. The WISP would be denied the opportunity to serve the community and to grow their business.

All of which would be the antithesis of the stated goals of the National Broadband Plan and this NPRM. And, if the arbitrary number was 99.995%, as proposed by Comsearch, or worse, the 99.999% proposed by Verizon, the Commission would be asked to deny economically viable broadband via microwave to most markets, rural and urban, resulting in a devastating impact on all related industries.

III. Auxiliary Stations

As with the FCC's proposal to allow adaptive modulation, it is a pity that some filers, instead of looking for innovative ways to improve the public condition through the deployment of auxiliary stations, they seek to maintain the status quo by raising the old and discredited fears of interference, excessive EIRP, mixing systems that operate in the time and frequency domains, increased congestion and abuse of the rules, while presenting no evidence or presenting evidence based on false assumptions.

Auxiliary Stations Will Not Cause Harmful Interference.

The Commission has addressed this issue by stating that auxiliary stations will be prior coordinated using the same regime as a primary station and therefore an authorized auxiliary station will not cause harmful interference to existing stations.

Auxiliary Stations Eliminate the Blocking of New Applicant Primary Systems

As stated by WSI in its comments, auxiliary stations are the most effective way to not only avoid, but to eliminate blocking the growth of prior coordinated primary systems.

Once authorized, an auxiliary station has secondary status and cannot block the growth of new applicants. By contrast, with legacy deployments all primary stations would block in excess of one million new applicant paths in an area larger than 50,000 square miles.

Unfounded Fear of Excessive EIRP

All authorized and existing stations can, by an equipment upgrade and no change in their authorized EIRP, add auxiliary stations.

As stated in WSI's comments, WSI expects innovative applicants will, in compliance with Section 101.113(a) of the Commission's Rules, design "smart" main (primary) links with the minimum amount of power necessary to carry out the communications desired. Therefore, WSI expects the average EIRP of a legacy main (primary) link and the average EIRP of a smart main (primary) link will be about the same, with auxiliary link EIRPs averaging only one percent of that of the average power of the main (primary) link.

In its comments, Verizon cites authorized station call signs WQGH 695, 696 and 697 operated by WSI in 2008 through 2010 as examples of why they expect abuse of the rules and the use of excessive EIRP. To make this argument they had to revert to the 2006 filed data. The facts are that due to rapid advances in technology, WSI was able to upgrade the equipment to Exalt TDD radios, eliminate the need for high power amplifiers, amend the licenses and operate the paths with an EIRP of 60dBm (which is below the national average for PTP links). Verizon also incorrectly states in their comments that the Prior Coordination Notice issued on behalf of OEM Communications LLC shows they are planning the use of excessive EIRP on three paths in San Jose, Ca. A review of the PCNs show that the planned EIRPs range from 52dBm to 62dBm, well below the number of 84.7dBm selected by Verizon.

Operation in Frequency and/or Time Domains will Increase the Effective Use of Spectrum

A backhaul connection from a Private Branch Exchange (PBX), a 2G cell site base station or an Ethernet 4G base station, either terrestrial T1 Carrier or microwave, will only be fully loaded for a very small percentage of the time (a percentage of the "busy hour" specified by the user) and will be very lightly loaded, or have no payload at all, in the middle of the night, with the overall average payload being a very small percentage of the payload capacity. Therefore, by sharing a microwave frequency channel between "n" base stations or enterprise facilities and engineering the network to achieve the Quality of Service (QoS) "busy hour" requirement, the Capital Expenditure (CAPEX) and Operating Expense (OPEX) will be significantly lower than deploying "n" dedicated systems, and the average channel payload will be significantly increased. That is, an FDD-TDMA or TDD-TDMA network will have a higher effective use of spectrum and a lower cost than that of a network consisting of dedicated links.

Operating in the Frequency and/or Time Domain will Not Cause Additional Interference

The transmitted EIRP from an authorized station necessary to achieve acceptable communications is the same whether it operates in the frequency domain (transmitting all of the time) or in the time domain (transmitting part of the time). The potential for interference remains the same and so does the interference prevention requirements of Section 101.103 of the Rules.

Summary of the facts and benefits

- Under the FCC's proposal, auxiliary stations will be prior coordinated using the same regime as a primary station and therefore an authorized auxiliary station will not cause harmful interference to existing stations.
- Once authorized, an auxiliary station has secondary status and cannot block the growth of new applicants. By contrast, with legacy deployments all primary stations would block in excess of one million new applicant paths over an area larger than 50,000 square miles.
- Auxiliary stations, within approximately six miles of a primary station, can be designed to provide permanent communication paths with the primary station while meeting the secondary status requirement of never causing harmful interference.
- There is no reason for stations that plan to put the side-lobe radiation to productive use to use excessive, and very expensive, EIRP.
- In congested areas such as Los Angeles, on congested paths auxiliary stations can reuse spectrum to provide service to additional locations without requiring any additional spectrum or causing any blockage of new applicant paths. Example: Consider a congested 6GHz path where all six 30MHz paired frequency channels are in operation by one or more licensees. Consider that a licensee has a requirement to provide service to eight additional locations within the main beam of the path. If the licensee upgrades the equipment from Frequency Division Duplex (FDD) to Frequency Division Duplex - Time-Division-Multiple-Access (FDD-TDMA), using auxiliary stations the new locations can be served on the same licensed paired frequencies with no added frequency pollution. However, the legacy option would require the licensee to find eight new paired frequency channels in one or more frequency bands. If possible and licensed, the eight links would each consume 60MHz of spectrum for a total of 480MHz, and each station would block in excess of one million new applicant paths in an area larger than 50,000 square miles, obviously wasting valuable spectrum in an already congested market.
- An auxiliary station would have no FCC-mandated antenna gain (size) requirement. Small antennas can lower the Operating Expense (OPEX) of microwave links by thousands of dollars per month. For operation in the 6GHz band, the regulations for primary stations mandate a minimum antenna gain that results in an antenna diameter of six feet. For a path with two 6-ft antennas, the monthly lease would typically range from \$1,200 to \$4,800. With an auxiliary station the antenna size can be reduced to lower the monthly antenna site lease charges to an average of less than \$100. In addition, and quoting from FCC WT Docket 07-54, "...smaller antennas would result in significant [additional] benefits, including: Low cost to manufacture and distribute, less expensive to install, weigh less, need less structural support, cost less to maintain, and the modest weight and small size make them practical for installation at sites incapable of supporting large antennas -- including many rooftops, electrical transmission towers, water towers, monopoles and other radio towers -- and smaller antennas raise fewer aesthetic

objections, thereby permitting easier compliance with local zoning and home owner association rules."

- The NPRM allowing auxiliary stations would make possible a plethora of product options including Point-To-Point (PTP) and Multiple-Point-To-Point (MPTP) FDD and Time-Division Duplex (TDD) plus FDD-TDMA and TDD-TDMA to cost effectively meet a variety of needs such as high-capacity low-latency, medium-capacity medium-latency and low-capacity low-latency, or any combination thereof.

IV. Conclusion

By the proposed changes to the Rules to allow adaptive modulation and auxiliary stations, the Commission can help propel the FS microwave industry from the 1970's into the 21st century, and exceed the expectations of Section 5 of the National Broadband Plan by:

- Dramatically increasing the effective use of spectrum.
- Conserving large amounts of spectrum.
- Eliminating the blockage of millions of future paths.
- Significantly decreasing the cost of backhaul and access.
- Making it economically viable to bring low-cost mobile, enterprise and residential broadband access to un-served and underserved communities.
- Lowering the cost of healthcare through the use of telemedicine via high-quality, low-cost licensed microwave.
- Increasing the size of the market for licensed microwave products and services by several hundred percent.
- Increasing jobs in R&D, manufacturing, path engineering, site construction, etc.

Respectfully submitted

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